

the reason before stated, has ordered all the scaffolding away, and the men who had just got into the spirit for their work were dispersed. The cost of scaffolding, &c., for such an undertaking is not small, and this must be entirely re-erected if ever the work goes forward.

An encaustic tile floor is about to be put down in the Ladye Chapel, at some considerable cost.

#### THE INTERIOR FORMS OF BUILDING, WITH REFERENCE TO THE LAWS OF SOUND.

A MEETING of the Institute of Architects was held on Monday, the 8th instant, Mr. Bellamy in the chair, when a paper on the above subject was read by Mr. Scott Russell.

Mr. Russell, in commencing his remarks, said, in excuse for interfering with what might be considered not his province, that although extreme division of labour might, and did, carry science forward, yet, by confining particular departments to classes, it induced narrow views. He thought good resulted from the professors of different sciences mixing together and interchanging opinions. It was difficult to excel in more than one, still there were many examples of those who had done so,—as Michael Angelo, Leonardo da Vinci, and others. If in any thing extra-professional aid was needed by architects, it was in the arrangement of buildings with reference to the transmission of sound, where all were avowedly at fault. All architects admitted that nothing was more difficult. Mathematicians, when applied to, gave widely different forms as the best. Even an ear-trumpet was no better made by the most profound mathematician than by the merest rule of thumb; and if it were so difficult to arrange an instrument by which sound might, with every advantage, be conveyed to one individual, how much more must it be to arrange a room so that every one in it might hear what was said. The problem was to enable 1 or 1,000 to hear equally well. The waves of sound were generally thought to be like the waves of water; he had been led to investigate the latter, and in so doing, had arrived at some conclusions not generally entertained. He proposed to divide the subject into five parts. The first principle to be mentioned was this, that sound travels in straight lines: light and sound are the same in this respect. Sound does not easily go round a corner; and this should be remembered in arranging buildings. The question was how to make the greatest number hear and see well. In the theatre of the Royal Institution in Albermarle street this had been successfully worked out: he thought that from every seat in the lecture could be most distinctly seen and heard. This was arranged by Count Rumford and Sir Humphrey Davy. The human voice, the lecturer remarked, could be heard 300 feet with ease; and he believed that a building might be arranged to seat 20,000 persons where all would hear; the fact that Wesley, preaching in a natural amphitheatre of hills, was heard by that number of persons justified his opinion. He had noticed that a reader in the choir of Canterbury Cathedral could be heard 200 feet off distinctly, and afterwards making the experiment himself with a friend, had found that he could be heard that distance when he spoke in a clear whisper.

Mr. Russell then proceeded to explain a curve which he had discovered, and recommended for the sectional arrangement of the seats, and the mode of obtaining it, but which we find it difficult to convey without diagrams. It was first necessary to fix the position of the speaker, and to decide how much of the voice and sight of the speaker each auditor should have: he thought an area 18 inches high and 3 feet broad sufficient. Drawing then a series of radial lines from the mouth of the lecturer to points decided by these dimensions, a curve was obtained for the rise of the seats, which was found in practice of good effect.

The second principle he would allude to was the spontaneous oscillation of air in a chamber, which was the source of much trouble, but might be turned to good account. A long chamber of air, if caused to oscillate, continued to do so, and would produce a tone depending

on the length,—as in an organ-pipe. Thus a gallery, 64 feet long, would produce the note C; and if 32 feet long, it would be an octave higher. Every chamber, in short, has a voice. A speaker should find out the key-note of the room, and speak in it if possible. This fact opened the question whether we could improve rooms for hearing by attention to the dimensions and proportions. Length, breadth, and height should be in harmonious proportions, or the sounds produced would jar: there was a more intimate connection between music and architecture than is now generally admitted. Simple multiples for the proportions were desirable; as, for example, 48 feet long, 24 feet wide, and 16 feet high, and so on. Incongruous sounds, he said, neutralize each other, and produce dead points, or points where the speaker would not be heard. Care was necessary in this respect.

Harmonious arrangement of an apartment might sometimes be obtained by means of pilasters, or partitions with doors. The choirs of our cathedrals usually approximated to simple multiples in their proportions, and bore out his view, he thought, by their effects. Incongruous forms made the worst apartments for hearing. The lecturer was then proceeding to speak of the third division of his subject, reflection of sound, but was invited to postpone the consideration of it till the next meeting.

#### AWARDS OF OFFICIAL REFEREES.

##### RIGHT TO INTERFERE WITH ADJOINING BUILDINGS.

A WAREHOUSE, situate No. 21, Bermondsey wall (call it A), consisting of two square stories and one in the roof, which was curved, having been in a great measure destroyed by fire, and the warehouse adjoining (call this B) being of a greater height, with dripping eaves all round, it was desired to rebuild or reinstate the first-mentioned warehouse, A.

The front and rear walls had been entirely rebuilt, and new floors and roof formed, except the first or ground-floor, and part of the second or one-pair floor. Under the schedule C, part 1, the district surveyor required that the curved roof should be replaced by a square story; and under schedule D, part 3, required that the party-wall should be carried up three feet above the gutter. Under sec. 31, he was of opinion that the wall was sufficiently secure to allow it to be raised.

The adjoining owner maintained that schedule D, before mentioned, did not justify interfering with an old adjoining building, which is not out of repair; that the form of notice, schedule M, No. 8, shows that it was not the intention of the law that a wall should be condemned on account of its being insufficient for a building owner, and that the previous section, 26, is the only one under which the building owner could proceed; that the common-law prescriptive right of possession for a sufficient number of years cannot be set aside, excepting by the express words of the statute ("Wells and Ody") and that the present words do not justify the claim.

Further, that section 31 does not enable a building owner to do all that is necessary to raise a building, but only to do so if he has the assent of the district surveyor, and can do it without interfering with the adjoining owner's property; this intention is clearly shown by his being authorized to do it without any notice.

The official referees were therefore requested to determine,

1stly. Whether the warehouse A has been, in the intention of the Act, rebuilt, or has been only reinstated or altered.

2dly. Whether the party-wall is required to be raised above the gutters of the adjoining building B, and can be so raised by the building owner without the consent of the adjoining owner, all notices and formal proceedings being supposed to have been taken.

And 3dly. Whether the building owner or adjoining owner should be at the expense of forming the lead gutter, and making good the roof of the adjoining owner's building.

The referees determined "that the warehouse (A) has been rebuilt within the meaning of the first-mentioned Metropolitan Buildings Act, and that the party-wall in question is by the

said Act required to be raised above the gutter of the adjoining building (B), and that subject to the proceedings directed and required by the said Act to be taken in that behalf, such wall can be so raised by the building owner without the consent of the adjoining owner; and that the wooden plate, and eaves upon the said party-wall are, so far as they go, of the nature of a party timber partition, and subject to the provisions of the said Act in respect thereof, and that such timber should be removed, and the party-wall, being otherwise sufficient, should be raised at the joint expense of the building owner and of the adjoining owner, but that the required new gutter, and making good the roof of the adjoining owner's building, must be made and done at the sole expense of the adjoining owner."

##### PROJECTION OF SHOP-FRONTS.

In the case of a proposed addition to a shop-front in Upper Baker-street, Pentonville, on which an award had been made, the building owner thought, on considering the award, that the proposed projections might be made to the extent required, provided they consisted of fire-proof materials. He thought his opinion was confirmed by the latter part of the clause in schedule E, headed, "Projections from facades," &c., and remarked, that in his opinion a fence-wall, inclosing the present garden of the said house, and standing before the line of fronts to the extent of the line of the proposed projections, would invite nuisance, and be a much more objectionable projection than the proposed shop possibly could be. He proposed, therefore, to construct the said projections with fire-proof materials. It must be added, that he had the written approbation of the owner of the adjoining house in Upper Baker-street.

The district surveyor (of Clerkenwell) considered that it would be contrary to the said Act to build the said shop-front to the extent proposed, and the question was sent to the referees.

The award was,—"that inasmuch as the extent proposed for the projection of the shop-fronts (namely, the line of the fence-wall inclosing the garden of the house in question) would exceed the ordinary and reasonable width of stall-boards to shops similar to the proposed shop, and such projection would be an extension of the shop, and not the mere addition of a shop-front before the line of the present external wall of the house, it will be contrary to the Metropolitan Buildings Act to build the shop-fronts, or any of them, in the line proposed, or to make any such projection, whether the same be or be not of fire-proof materials; but that if such front be formed of fire-proof materials, and do not exceed in projection the ordinary and reasonable width of stall-boards to shops similar to the proposed shop,—which width is, in our opinion, not more than two feet,—and if no extension of the shop, as distinguished from the shop-front, be made beyond the present line of the front wall of the house, then it will not be contrary to the said Act to erect the same."

##### ARTIFICIAL LIGHT FOR PAINTING.

It is well known, that ordinary artificial light, such as that obtained by the combustion of wax, tallow, oil, or carburetted hydrogen gas from coal, produces a tinge of colour very different from that produced by the white light of the sun. This very much affects the appearance of colours exposed to artificial light, and prevents the continuance of some operations after the sun has gone down. For artists it would be especially important to obtain light free from this tinge; and we therefore think it desirable to point attention to a paper on this subject, by Mr. Tait, a vice-president of the Scottish Society of Arts, published in the *Edinburgh New Philosophical Journal* for January.

The writer remarks,—"The sensation of colours is caused by objects reflecting or transmitting colours produced by the rays of light to which they are exposed. There are three primary colours, yellow, red, and blue; of two, or all of which, combined in various ratios, all other colours are composed. Light, with very rare exceptions, is compound or heterogeneous, producing two or all of the primary colours. The pure light of the sun produces them in

\* Mr. Godwin remarked, after the reading of the paper, that the arrangement of this theatre was usually attributed to the late Mr. Webster, the geologist, who built it, being then an architect.

† This was published by Mr. H. some years ago, and is illustrated in Gell's "Encyclopaedia."

\* See paper on this subject, p. 2, ante.